Coding Tip: `return` vs `print`

- `return` allows sending *(dispatching)* a value from a function to the caller point:

```python
afterTax = applyTax(1800, 0.05)
```

- `print` only *displays* the value on the output device, e.g., monitor.
Announcements

- **Lesson03** *(due on Wednesday 9/14 10:00 pm)*
- **HW01** *(due on Monday 9/19 10:00 pm)*
- **Lesson04, Lesson05** *(due on Wednesday 9/21 10:00 pm)*
- We will be posting **Project milestone 1** soon 😊
Topics Covered in Week 4 (Lesson04)

- Program Flow
  - Linear
  - Conditional
  - Repetition

- Functions
Today's Plan Week 4 (Lesson05)

- Loops
  - for loop
  - range function
  - while loop
The **range** Function

```python
range(start, end, step)
range(start, end)
range(end)
```

Returns a list of numbers:

- **start** represents the start of the range.
- **end** represents the end (exclusive) of the range.
- **step** is an integer representing the value of the increment.
Definite Loops: \texttt{for} loop

- A definite loop repeats for a specific number of times
  
  \begin{verbatim}
  for var in sequence:
    body
  \end{verbatim}

- Looping 5 times using \texttt{for}
  
  \begin{verbatim}
  # Loop 5 times using for
  for i in \texttt{range(5)}:
    # do work
    print(i)
  \end{verbatim}

Output
\begin{verbatim}
0 1 2 3 4
\end{verbatim}
total = 0
for i in range(5):
    # read a value from the user
    num = eval(input("Enter a number "))
    total = total + num

print("average = ", total / 5)
Definite Loops: counter-controlled \texttt{while} loop

counter = 0
\textbf{while} counter < value :
  \textbf{body}
  counter = counter + 1

\# Loop 5 times using while
\# Begin with \texttt{i} = 0
\texttt{i} = 0
\textbf{while} \texttt{i} < 5:
  \# do work till condition \texttt{i} < 10 is met
  \textbf{print}(\texttt{i})
  \texttt{i} = \texttt{i} + 1
Indefinite Loops

```python
while condition:
    body
```

- The condition is a Boolean expression.
- The body is a sequence of one or more statements.
- The loop executes repeatedly as long as the condition remains True.
- When the condition is False, the loop terminates.
Indefinite Loops

Find the first factor of 91 using a while loop

```python
n = 91
factor = 2  n/ factor == 0
while (<CONDITION ??? >):
  <UPDATE STATEMENT ??? >
    factor = factor + 1
print (factor)
```
Group Exercise

Create a group of two or three colleagues and work on the following exercise:

- Write a program that prints the sum of odd numbers between 1 to 100 (using if statement)
Today’s Lecture:

- Loops (definite and indefinite)
  - range function and for loop
  - while Loop

Next Lecture:

- File processing